

CASE REPORT

Prosthodontic Rehabilitation of Segmental Mandiblectomy Patient with Mandibular Guidance Prosthesis

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ABSTRACT

Loss of maxillofacial structures due to neoplasm, trauma and accidents gives inconsolable mental, physical and psychological agony to a person. To plan and execute rehabilitation of such patients is probably one of the most intellectually and technically demanding task faced by prosthodontists. This case report describes treatment of a female patient, who underwent right segmental mandiblectomy, secondary to ameloblastoma. An acrylic mandibular guiding appliance was constructed to help control the mandible deviation and coordinate masticatory movements.

Keywords: Mandibular deviation, Mandibular guidance appliance, Segmental mandiblectomy.

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INTRODUCTION

Acquired defects of the head and neck region can be devastating to the patients and presents considerable reconstructive challenge for the prosthodontists. The defects created by the surgery results in damaging effects on functional, cosmetic and psychological aspects of the patient. As Curtis and Cantor said, one of the most difficult area in maxillofacial prosthodontics is the rehabilitation of patients with radical surgery for carcinoma of tongue, floor of mouth and mandible.¹ Post segmental mandiblectomy patient suffers from various post operative problems like impaired speech articulation, deviation of mandible during functional movement, compromised control of salivary secretion,

difficulty in swallowing, problems with mastication and severe esthetic disfigurement. Improving esthetics and mastication are the reasonable objectives in these patients.² The functional disabilities of mandible resections are primarily dependant on the amount resected, method of closure and amount of deviation of mandible. For successful prosthodontic rehabilitation of a segmental mandiblectomy patient, the part of bony mandible and the teeth that remains has to articulate with normal structures of maxilla. Several prosthesis have been used to reduce or eliminate mandibular deviation like inter-maxillary fixation, guidance ramp in the maxillary,³ cast metal mandibular resection restoration,⁴ acrylic guiding flange, cast metal guidance flange prosthesis⁵ crowns with the maxillary prosthesis to guide hemimandible,⁶ functionally moulded palatal ramp⁷ and twin occlusal table in the maxillary arch.⁸ This case report describes treatment of a patient, who underwent right segmental mandiblectomy with an acrylic mandibular guiding appliance.

CASE REPORT

A 34-year-old female patient reported to Department of Prosthodontics with complaint of difficulty in mastication due to deviation of jaw and unesthetic appearance. The treatment history included right segmental mandiblectomy for treatment of ameloblastoma followed by reconstruction using skin graft. Extraoral examination revealed facial asymmetry with chin deviated towards right side. The deviation of mandibular midline from facial midline was around 3.5 mm at rest and deviation increased progressively with opening (Fig. 1). Intraoral examination revealed bone resection of right side of mandible along with dentition posterior to first premolar followed by reconstruction using skin graft. There was rotation of the mandible on the right side also leading to an open bite on right side progressively increasing from anterior to posterior teeth. Severe contracture of scar tissue was seen. Intraorally maxillary midline approximated with the middle of mandibular left lateral incisor (Fig. 2). The deviation increased progressively with opening of jaw. Orthopantomogram (OPG) revealed segmental surgical defect from distal aspect of 44 upto the angle of mandible.

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Fig. 1: Deviation of mandibular midline from facial midline



Fig. 2: Intraorally maxillary midline

Treatment Plan

The treatment plan was to fabricate mandibular guidance appliance or an acrylic guiding flange to guide the mandible followed by rehabilitation with removable partial denture. Mandibular guidance flange was decided as patients mandible could be positioned in an uninterrupted way without any resistance.³

Fabrication of Mandibular Guidance Appliance

The preliminary impressions were made in irreversible hydrocolloid and addition silicone (putty consistency) (Fig. 3). The casts were poured in dental stone. The next step was to manipulate the mandible to the unresected side to a static centric position and record that position using impression compound (Fig. 4). The casts were mounted on this recorded position (Fig. 5). Wire bending with 19 gauge stainless steel wire was done to connect buccal and lingual flanges of guiding appliance, crossing occlusal surface between canine and first premolar and between first and second molar. U loops were made

with wire to reinforce acrylic resin. After wire bending, the flange part was fabricated using clear self cure acrylic resin. The prosthesis was finished, polished and then inserted in patient's mouth (Fig. 6). The patient was advised to use the guiding appliance continuously for a period of 6 weeks with regular follow-up. The guiding flange helped to guide the mandible so as to achieve optimal occlusion on the unaffected side. After using guiding flange for about 4 weeks, the patient was able to close the mandible so as to bring occlusion on the left side and was able to maintain the position without guiding flange.

DISCUSSION

When a mandible has been resected, the movement of the mandible in the functional range and occlusal proprioception differ from that of movements and occlusion of normal mandible. The remaining mandibular segment will retrude and deviate towards surgical site in frontal plane. When opening the mouth, the deviation increases,

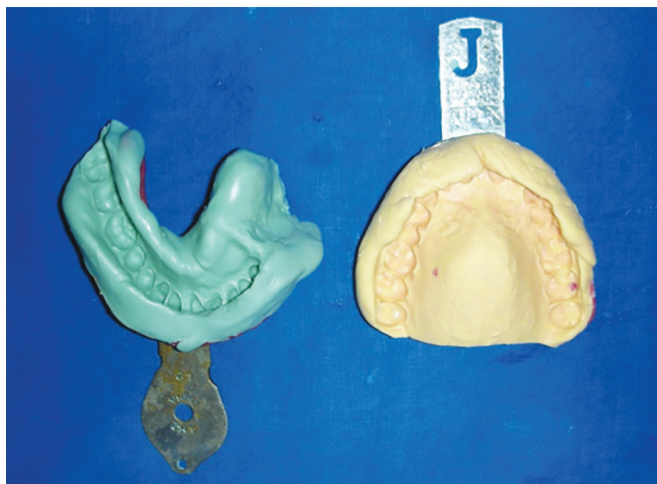


Fig. 3: Preliminary impressions



Fig. 4: Manipulate the mandible using impression compound

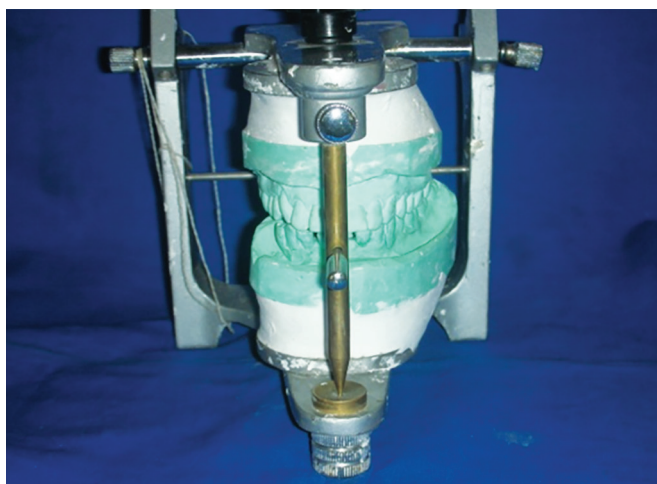


Fig. 5: Casts were mounted



Fig. 6: Prosthesis was finished, polished and then inserted in patient's mouth

leading to an angular pathway of opening and closing. The normal hinge movement parallel to sagittal plane is lost. Also, because of the absence of attachment of the muscles of mastication on surgical side, there is significant rotation of mandible upon forceful closure. The primary determinant for the abnormal position of mandible could be suprahyoid muscles,⁹ or could be the uncompensated influence of the contralateral muscles, especially the internal pterygoid muscle.¹⁰ During mastication, entire envelope of motion occurs on the surgical defect side.⁹ The amount of deviation of mandible to resected side depends on the amount of soft and hard tissue surgically removed, method of surgical site closure, fibrosis due to radiation therapy, scar contracture, tight wound closure, muscle imbalance secondary to primary resection, radical neck dissection, presence, absence and state of remaining teeth, loss of proprioception and the time at which prosthodontic therapy was initiated.^{3,5,9} The mandibular surgical resection also significantly alters the maximum occlusal force¹¹ and the masticatory performance seems to improve with prosthodontic rehabilitation.¹²

Occlusion can only be developed in these patients to static centric position record rather than truly repeatable centric relation. Hence, the basic objective in rehabilitation of such patients is retraining the remaining mandibular muscles to provide an acceptable maxillomandibular relationship of the remaining portion of mandible. The mandibular guidance flange can be given to achieve an acceptable maxillomandibular relationship. Earlier the mandibular guidance therapy is initiated, more successful is the result.¹⁰ The flange engages the maxillary teeth during mandibular closure, and hence directs the mandible in the optimal intercuspal position. Presence of teeth in both the arches is important for effective guidance and reprogramming of the mandible.³ The factors that have to be

considered while giving a mandibular guidance therapy are (1) Timing of rehabilitation – the results are better if the guidance therapy is initiated as early as possible, (2) whether the guidance therapy should be given for the maxilla or mandible – a mandibular guidance flange can be used when mandible can be positioned in an uninterrupted way, whereas, if some resistance is encountered in positioning of mandible, a maxillary guidance ramp in acrylic is suggested, (3) it is only an interim treatment to correct the deviation as much as possible, and occlusion is the primary determinant.³ The occlusal relationship that is finally obtained, depends on the degree of reduction of mandibular deviation, the amount of frontal plane rotation. Successful guidance therapy or complete correction from deviation depends on extent of soft tissue loss, tight wound closure, radiation therapy, radical neck dissection and delay in initiation of guidance therapy.

CONCLUSION

The result of mandibular resection includes esthetic deficit, functional disabilities, occlusal disabilities and most importantly psychological distress to the patient. The mandibular guidance therapy interferes with the deviated mandibular movement and modifies and corrects the neuromuscular control of the patient. The appliance is used as an interim basis to aid the neuromuscular system of the patient adapt to the repositioning of the deviated mandible to correct occlusion.

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